



DETERRENT EFFECT OF PLANT INFUSIONS ON *DEROCERAS LAEVE* (O. F. MÜLLER, 1774)

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ABSTRACT: Plant infusions: 1.0% tea, 0.5% onion and 2.0% garlic, were found to limit the feeding of *Deroceras laeve* (O. F. Müller, 1774). Their absolute deterrence index was 92.96; 95.32 and 92.61, respectively. 0.5% coffee infusion, 0.5% and 1.0% garlic infusions proved to be slug attractants, with palatability indices of 2.09, 2.12 and 2.08, respectively.

KEY WORDS: terrestrial slugs, pests, *Deroceras laeve*, plant infusions, deterrent effect

INTRODUCTION

Deroceras laeve (O. F. Müller, 1774) is the most common slug in crops cultivated in greenhouses or foil tunnels. In favourable conditions it occurs in masses and causes considerable damage to cultivated plants (DANKOWSKA & BARANOWSKI 1995, 1998, DANKOWSKA 1996). Molluscicides which are used at present for plant protection are not always effective. New substances are still sought, which would limit the

palatability of plants, and thus decrease or completely prevent slug feeding. They may be extracts or infusions from plants which have a deterrent effect on gastropods (BARONE & FRANK 1999, KOZŁOWSKI et al. 2003, 2004, PISAREK 2003).

The objective of this study was to test coffee, tea, onion and garlic infusions for their deterrent effect on *D. laeve*.

MATERIAL AND METHODS

The experiment consisted in testing, in the laboratory, coffee, tea, onion and garlic infusions at concentrations of 0.5%, 1.0% and 2.0%. Weighed plant material (natural coffee, leaf tea, crushed onion leaves and garlic cloves) was placed in an adequate quantity of boiling water and left, covered, for 24 hours. Then it was filtered through filter paper; leaves of white cabbage (*Brassica oleracea* var. *capitata*), 3 × 3 cm in size, were submerged in thus prepared infusions for 5 minutes. Control leaves were submerged in water. Then the leaves were placed on Petri dishes of 10 cm diameter, on three layers of humid filter paper. The experiment included four trials, each of 5 slugs per dish. In order to estimate the intensity of feeding, the cabbage leaves were weighed before the experiment, and after 7 days, when the experiment was concluded. The per-

centage of the leaf mass consumed, palatability index (ratio of consumed infusion-treated leaf to the consumed untreated leaf), and the absolute deterrence index (ADI), based on the feeding of slugs on control and infusion-treated food, were calculated. The ADI index was calculated according to the formula (KIEŁCZOWSKI et al. 1979):

$$ADI = \frac{(K - T)}{(K + T)} \times 100$$

where: K – mass of consumed control leaf (product of all trials); T – mass of consumed leaf of the tested combination (product of all trials).

The results were statistically analysed with Duncan's test at $\alpha = 0.05$.

RESULTS AND DISCUSSION

The effect of plant infusions on the slug feeding varied (Table 1 and Figs 1–3).

Of the tested infusions the best effect was observed for: 1.0% tea infusion, 0.5% onion and 2.0% garlic. They limited the feeding of *D. laeve* to a large extent

(ADI 92.96; 95.32 and 92.61, respectively). Also PI-SAREK (2003) in her studies on garlic obtained high ADI values (78.20 for 5% garlic extract and 84.52 for 10%). Positive results with a liquid form of garlic applied to soil next to plants were obtained in English

Table 1. Effect of plant infusions on feeding of *Deroceras laeve*

Infusion and concentration	Mean leaf mass [mg]		Percent of consumed leaf mass	Palatability index	ADI
	Initial	Final			
Coffee 0.5 %	0.335	0.033 a	90.45	2.09	32.80
Coffee 1.0 %	0.961	0.646 b	32.78	0.76	25.79
Coffee 2.0 %	0.369	0.125 a	66.12	1.53	68.25
Tea 0.5 %	1.004	0.698 b	30.48	0.70	33.91
Tea 1.0 %	1.342	1.174 c	12.52	0.29	92.96
Tea 2.0 %	0.929	0.550 b	40.80	0.94	– 10.84
Onion 0.5 %	1.004	0.797 b	20.52	0.47	95.32
Onion 1.0 %	0.994	0.689 b	30.68	0.71	48.62
Onion 2.0 %	0.902	0.534 b	40.80	0.94	– 5.13
Garlic 0.5 %	0.369	0.031 a	91.60	2.12	12.66
Garlic 1.0 %	0.353	0.036 a	89.80	2.08	25.52
Garlic 2.0 %	1.043	0.857 bc	17.83	0.41	92.61
Control	0.828	0.470 b	43.24		

Values marked with the same letter do not differ significantly

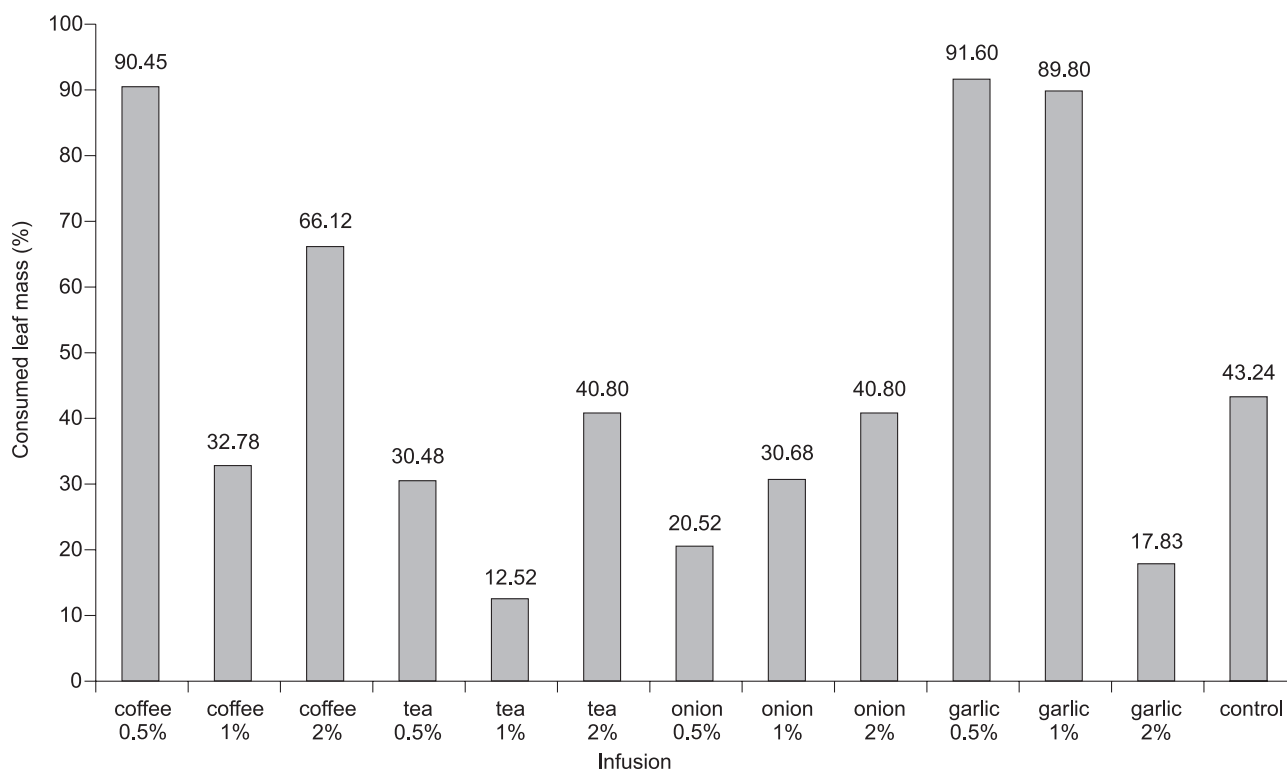


Fig. 1. Leaf mass consumed by *Deroceras laeve* in presence of different plant infusions

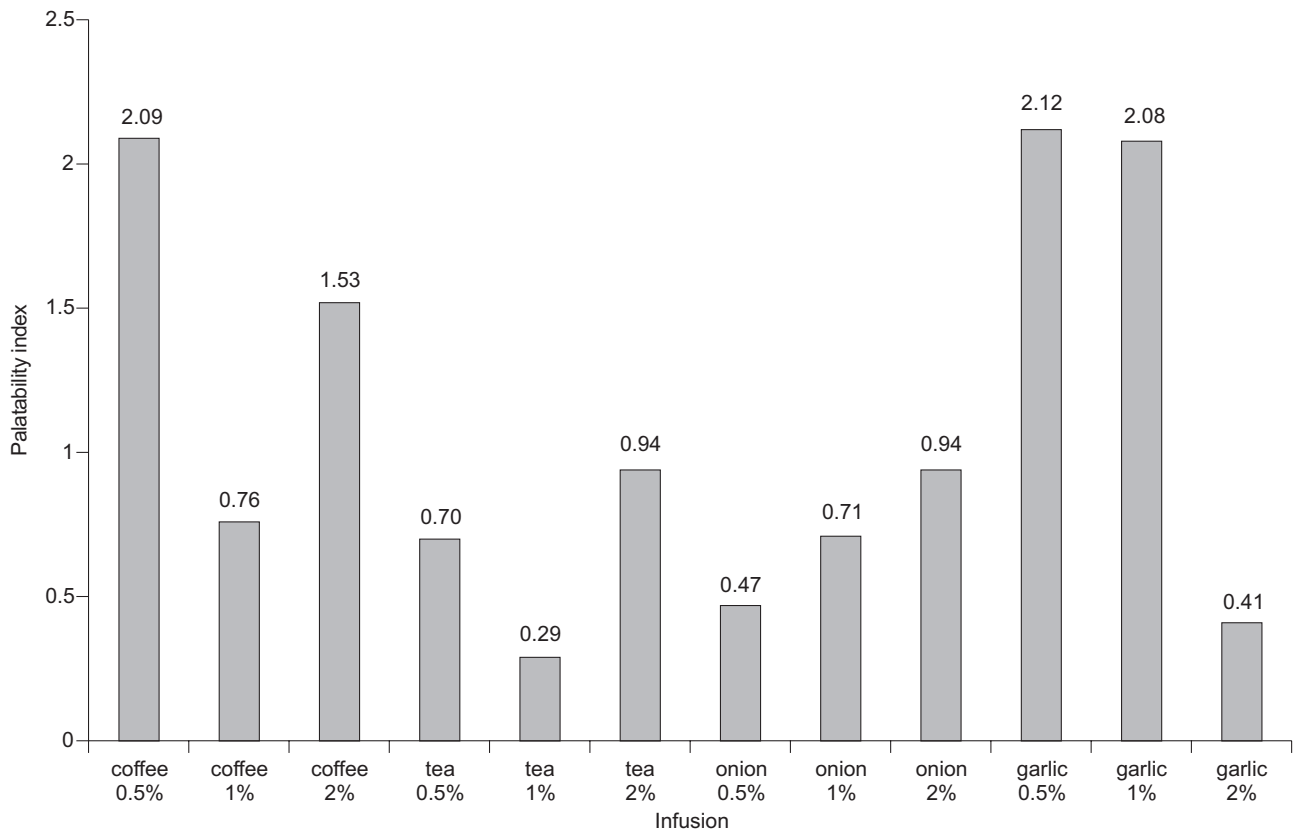


Fig. 2. Effect of different plant infusions on palatability index for *Deroceras laeve*

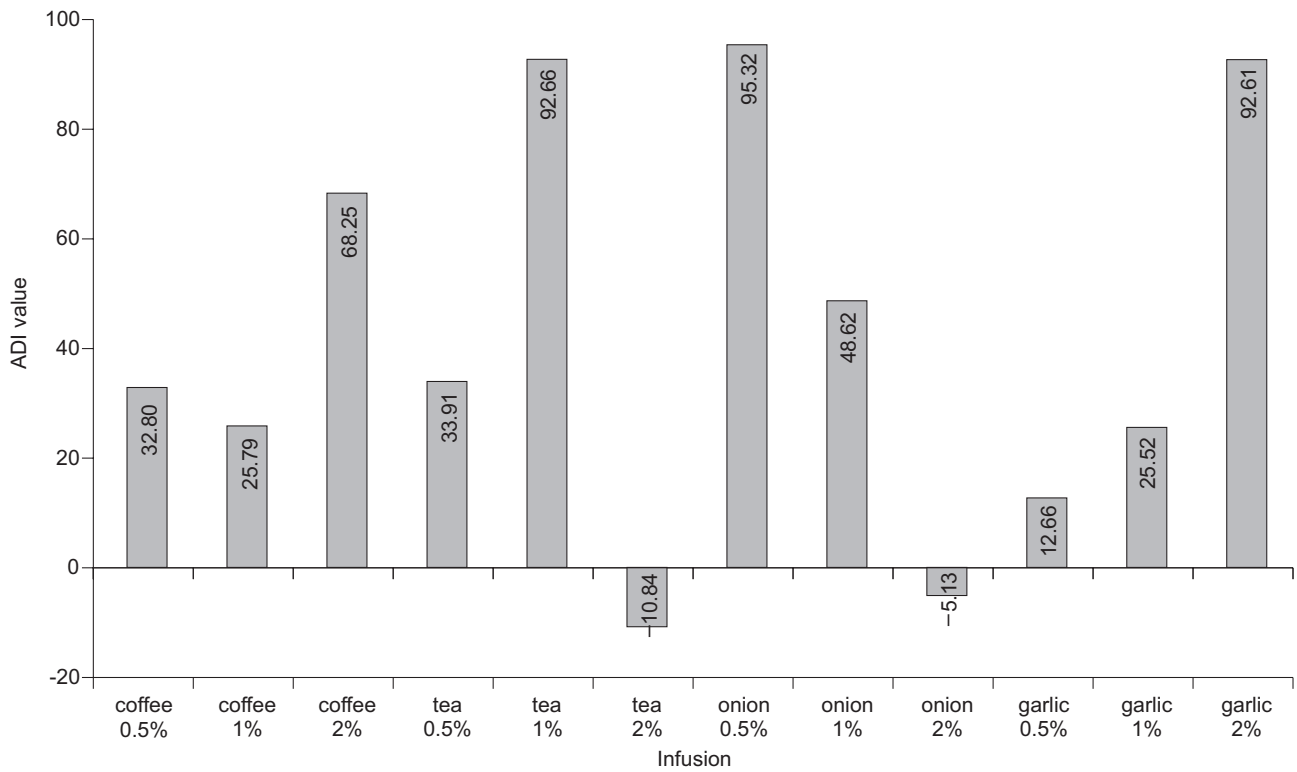


Fig. 3. Absolute deterrence index for *Deroceras laeve* fed with different plant infusions



studies (ANONYM 2003). On the contrary, 0.5% coffee infusion, 0.5% and 1.0% garlic infusions proved to be slug attractants. Their palatability indices were 2.09, 2.12 and 2.08, respectively. They increased the attrac-

tiveness of food and the intensity of slug feeding. The proportion of leaf mass consumed was 90.45, 91.60 and 89.80, respectively.

CONCLUSIONS

1. Some plant infusions can considerably limit feeding of *Deroceras laeve*, in other cases they may increase attractiveness of plants.
2. The studies should be extended to deterrent effect of plants on feeding of other gastropod species.

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